Model L5-C

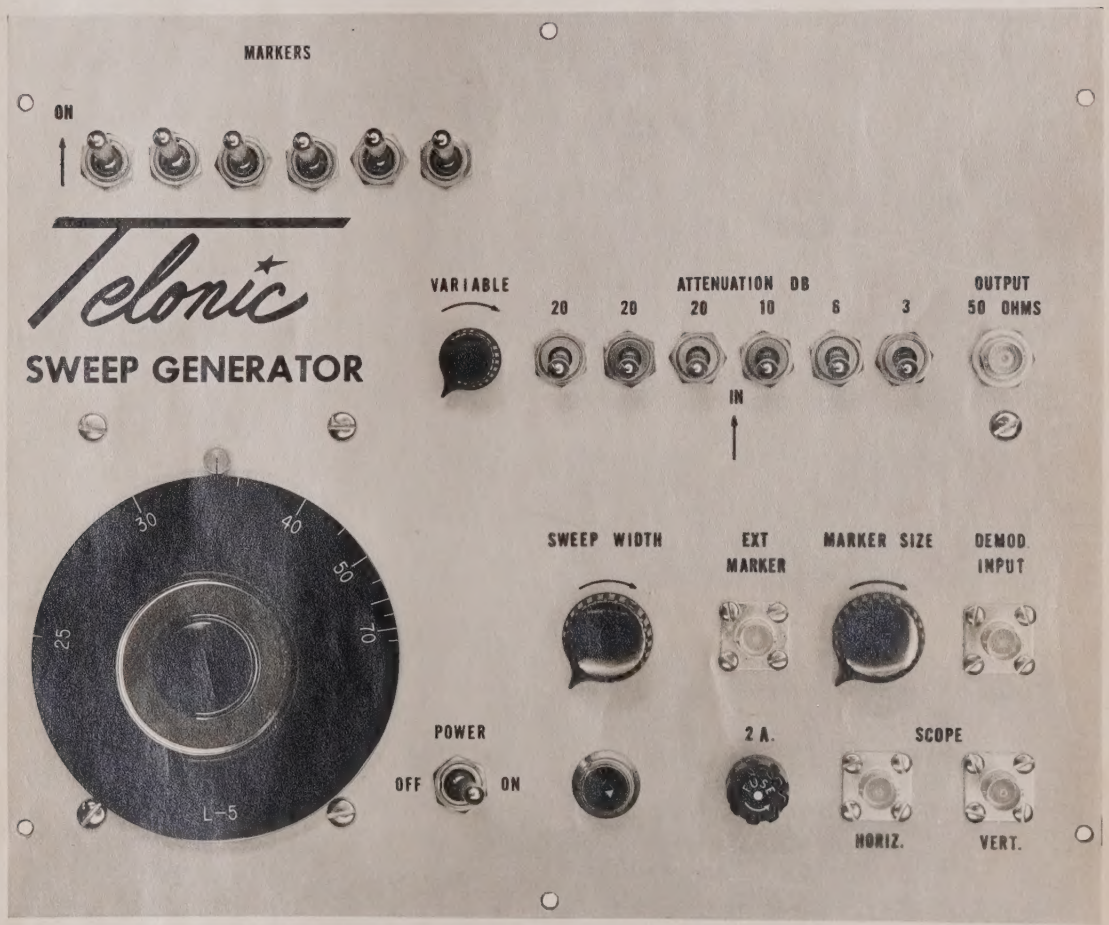
Telonic

BEECH GROVE, INDIANA

OPERATING INSTRUCTION MANUAL

SWEEP GENERATOR

MODEL L5-C



TELONIC INDUSTRIES, INC. BEECH GROVE, IND.

SPECIFICATIONS

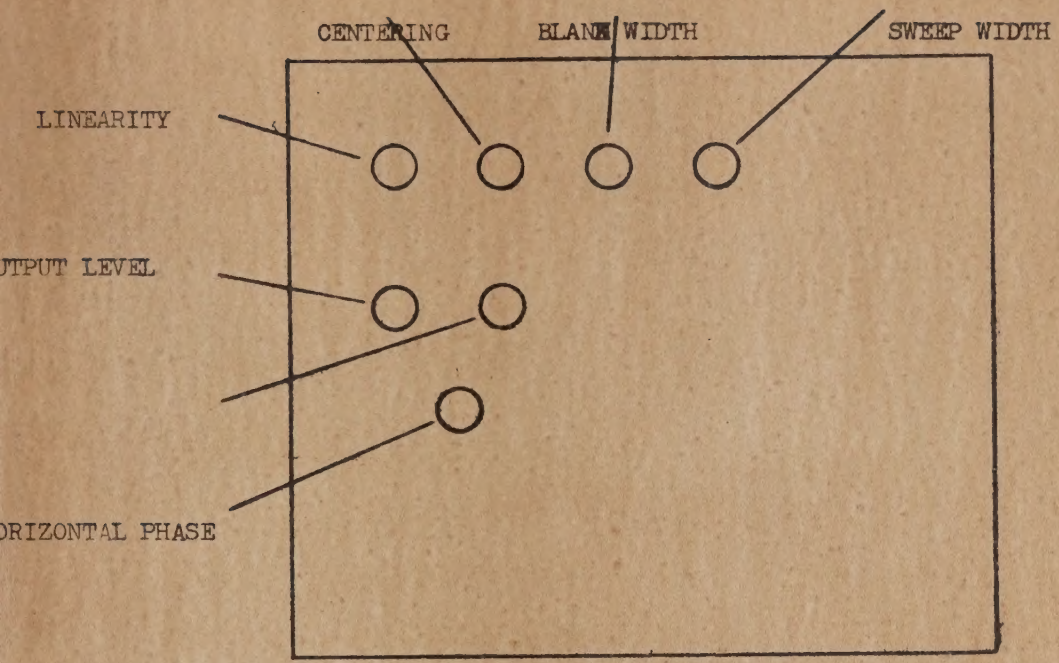
MODEL L5-C SWEEP GENERATOR

CENTER FREQUENCY RANGE	25-70 mc.
SWEEP WIDTH	0-40% of center frequency
SWEEP RATE	60 cps.
OUTPUT VOLTAGE	1 volt RMS
OUTPUT IMPEDANCE	50 ohms
ATTENUATION	20, 20, 20, 10, 6, 3 db. toggle switch--plus vernier 0, 0-10 db.
LEAKAGE	Less than 10 microvolts
DISPLAY LINEARITY	1.2:1
FLATNESS	Within 5%
SCOPE HORIZONTAL SWEEP VOLTAGE	Sawtooth waveform approximately 40 v. peak to peak .
ZERO BASE LINE	
PHYSICAL DESCRIPTION	Portable--10" X 12" X 9½"--Black finish case, gray anodized front panel. Weight Approx. 25#
POWER	50-60 cps. 110/120 v., 50 watts, fuse 2 amp.
CRYSTAL MARKERS	Crystal-controlled plug-in markers at the following frequencies: 28.4 mc 29.6 mc 30.0 mc 30.4 mc 31.6 mc 60.0 mc
EXTERNAL MARKER INPUT	Marker input for external signal source.
BIRDY-BY-PASS CIRCUITRY	The input from the external marker input is mixed with a sample of the sweep oscillator signal to produce beatnotes or birdies. These are amplified and superimposed upon the detected R.F. output signal before it is applied to the vertical scope input. Amplitude of the markers is adjusted over a wide range.
TUBE COMPLEMENT	1---6AF4A 2---12AX7 3---6AU6 1---0B2 2---EL-84 1---5Y3 6---6CB6

DESCRIPTION OF FRONT PANEL CONTROLS

MODEL L5-C

SWEEP DIAL	Approximate center frequency of sweep.
SWEEP WIDTH	This potentionmeter is used to vary the amount of voltage supplied to the variable inductance and can be used to adjust the sweep width.
SCOPE HORIZONTAL	These terminals are connected to the scope horizontal amplifier input. Using the waveform at these terminals will produce a more linear and more stable presentation than by using the internal horizontal drive of the scope.
POWER ON/OFF	Power switch.
ATTENUATOR	Toggle switch attenuator provides indicated amounts of attenuation.
VERNIER ATTENUATION	10 db. of vernier attenuation.
OUTPUT	Sweep output 50 ohms (BNC connector)
FUSE	Use 2 amp. 3AG fuse for replacement
MARKER SWITCHES	Supplies B plus to crystal oscillators when switch is in up position.
EXTERNAL MARKER	Marker input for external signal source.
MARKER SIZE	Varies the amplitude of the marker signals.
SCOPE VERTICAL	This connector should be connected to the vertical input terminals of the scope for viewing the demodulated signals and markers.
DEMODULATED INPUT	The demodulated signal from the device being tested is fed into this connector so that marker signals may be superimposed.



INEARITY — Varies the linearity of the horizontal output sawtooth and is adjusted for best sweep linearity.

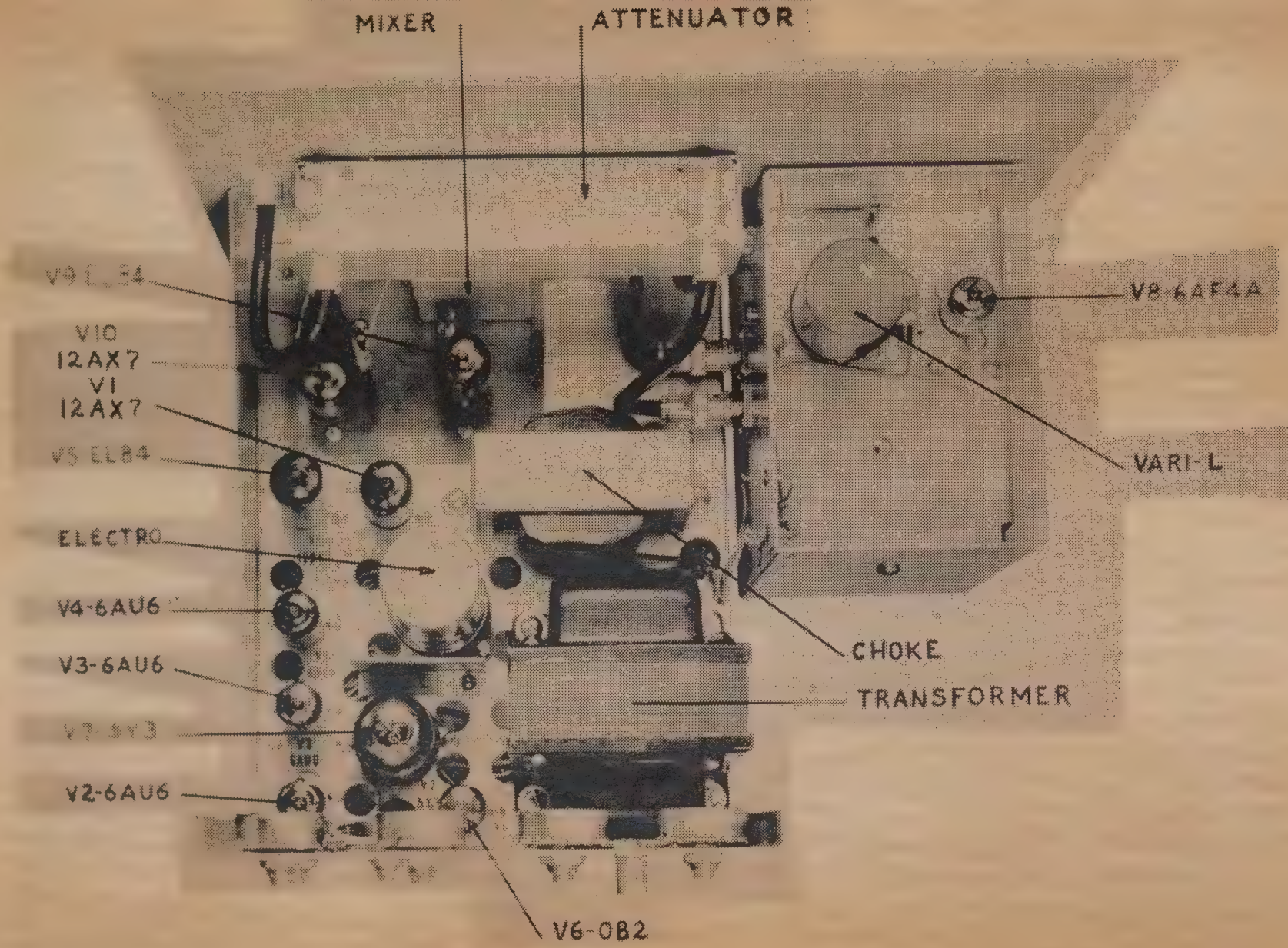
ENTERING — Controls the average current through the saturable inductance control winding. It is generally set for best linearity when operating at maximum sweep width, which is approxitmately *27 ma. for this model.

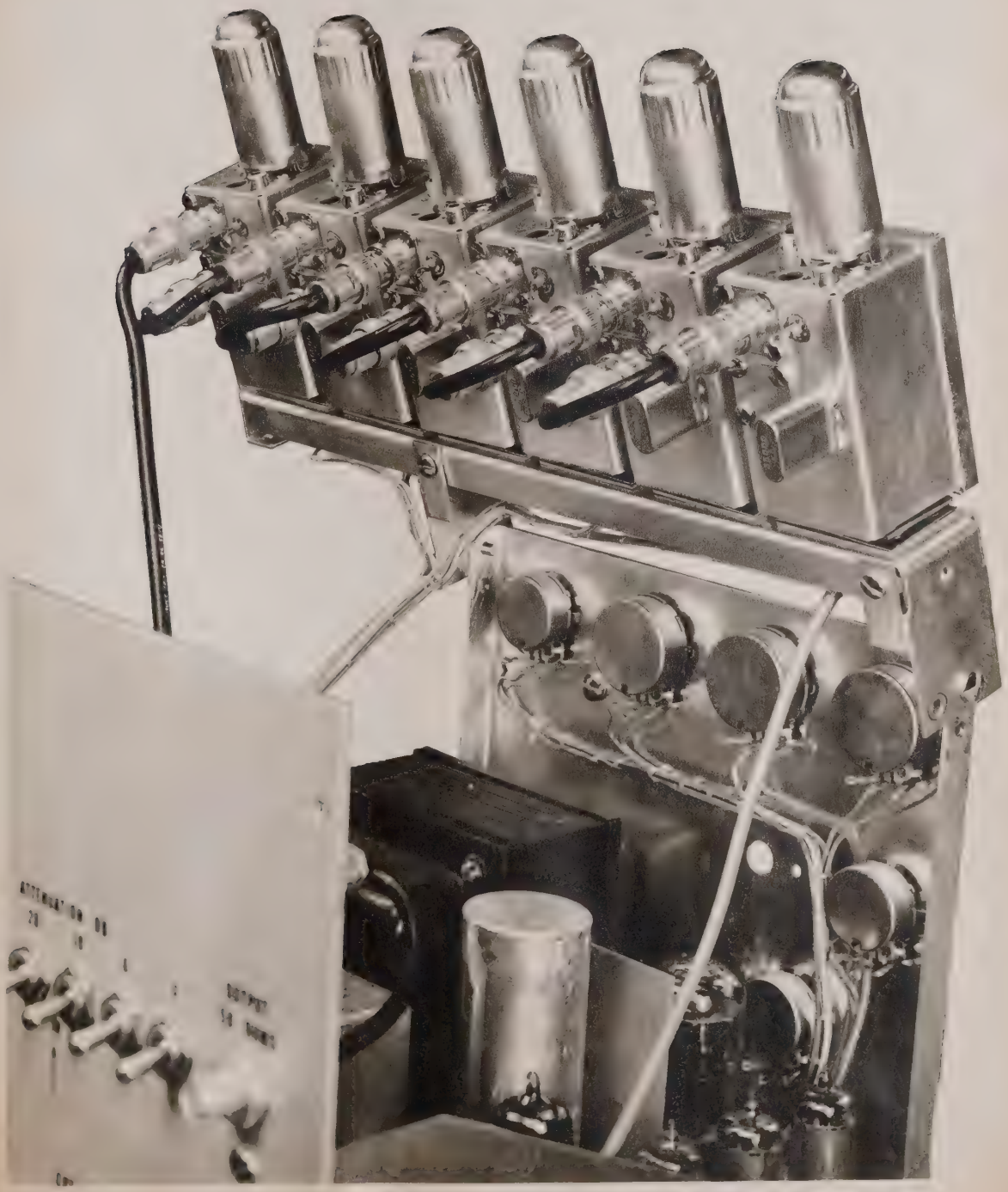
LANKING WIDTH — This potentiometer is the grid resistor for the blanking pulse amplifier (V2). It is adjusted to blank slightly more than one-half of the sweep cycle to produce a zero base line.

WEEP WIDTH LIMIT — For adjusting the maximum amplitude of the sawtooth drive to the saturable inductance.

UTPUT LEVEL — Controls the average B plus voltage supplied to the sweep oscillator and is adjusted for maximum leveled output voltage.

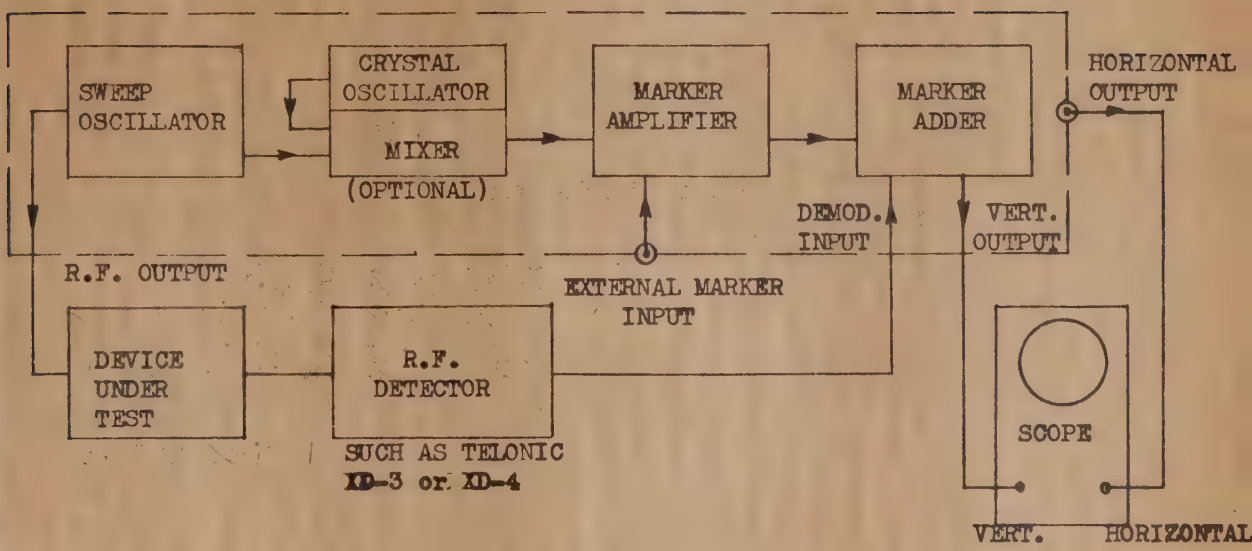
ORIZONTAL PHASE — Adjusts the sweep and horizontal phase in reference to the phase of the blanking pulse.


MIXER
ATTENUATOR
V9 E_F4
V10
12AX7
V1
12AX7
V5 EL84
ELECTRO
V4-6AU6
V3-6AU6
V7-5Y3
V2-6AU6
V6-0B2
V8-6AF4A
VARI-L
CHOKE
TRANSFORMER



OPERATING INSTRUCTIONS

TYPICAL SET-UP



The following procedure is recommended for setting up this instrument in test position.

1. Connect unit to 110/120 v., 50/60 cps. supply and switch power on.

2. Make connections to detector and oscilloscope as shown above, omitting the "device under test".

3. Set vernier attenuator to maximum and switch attenuator steps out (downward).

4. Set sweep width to maximum (clockwise).

5. Turn Marker Switches on (up) or inject external CW signal to produce a marker.

6. Rotate SIZE control clockwise until markers are of convenient size.

   REAR PANEL CONTROLS are adjusted at factory and instrument is ready to use. However, should it be desirable to check these adjustments, follow these steps.

7. Adjust horizontal phase and Blanking Width to produce a rectangular pattern on scope.

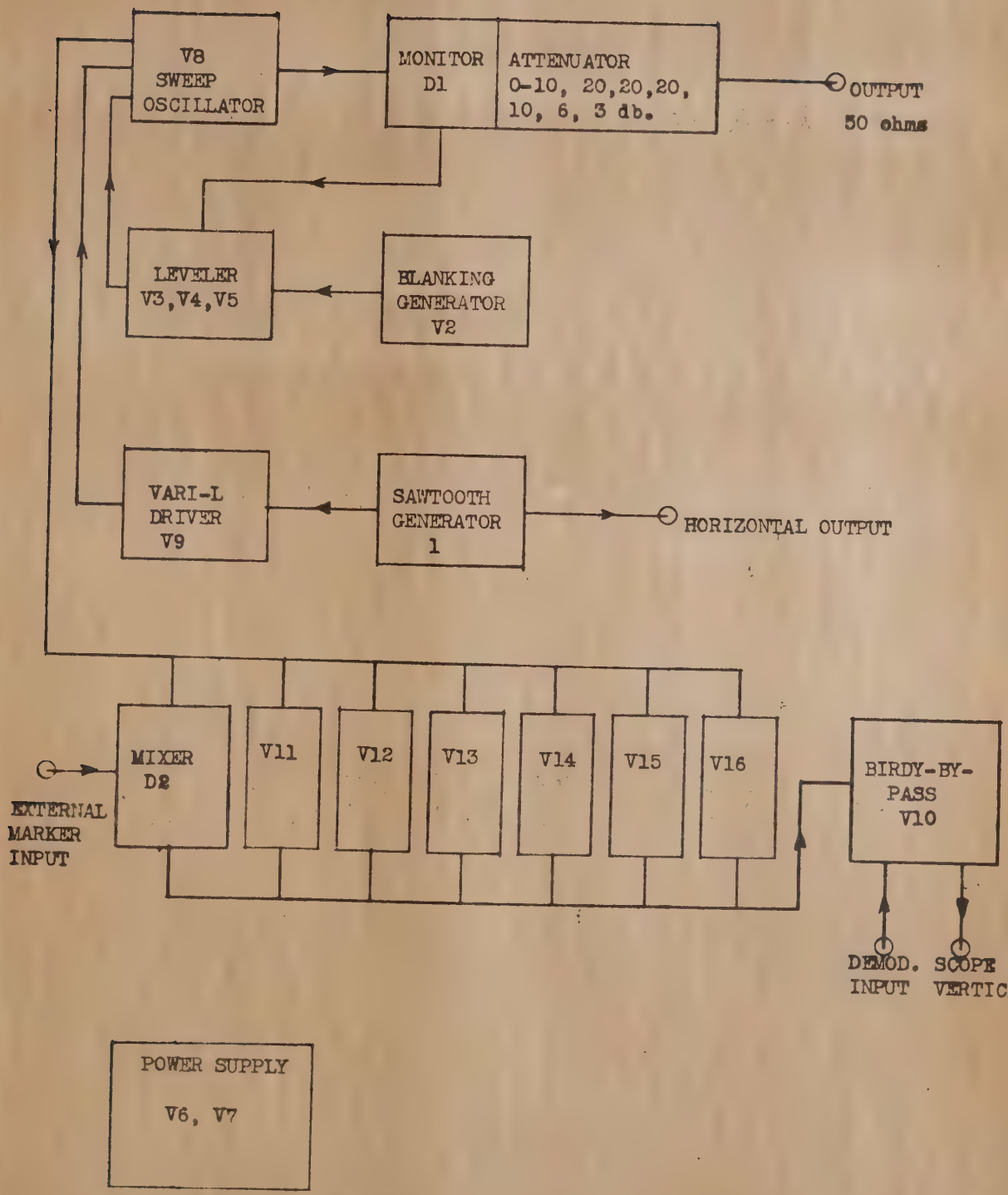
8. Adjust the OUTPUT LEVEL control (R.P.) for maximum Leveled Out-Put at the low frequency end of band.

9. The SWEEP WIDTH may be used to limit the sweep width.

10. CENTERING may be used to adjust the center frequency.

11. Adjust linearity for the most linear display.

BLOCK DIAGRAM



GENERAL DESCRIPTION

BLANKING AND HORIZONTAL CIRCUITRY

The blanking and horizontal sweep voltages are wriginated by square wave producing circuits. The 6.3 v. filament and the 6.3 v. phasing windings of the power transformer are connected in series to obtain a 12.6 voltage C.T. to ground. This voltage is connected through the phasing networks to one of the grids of the 12AX7 and to the grid of the 6AU6.

The square wave output of the 6AU6 controls the EL 84 sweep oscillator voltage regulator tube and thus deprives the tuned oscillator of voltage during $\frac{1}{2}$ of each cycle. The phase of this blanking voltage is adjusted by the rear panel control so that the lowest frequency being swept is located at the left of the scope presentation. The square wave output of one triode of the 12AX7 is applied to the other triode through an RC network. This is designed to produce a linear sawtooth waveform.

The second triode is connected as a cathode follower and produces the same sawtooth output. This horizontal sweep voltage is used to produce the frequency sweep. A RC network connecting this triode to the horizontal terminals distorts this sawtooth. The linearity control on the rear panel is part of this network and is adjusted for best display linearity.

AUTOMATIC OUTPUT LEVELING CIRCUITRY

A sample of the sweep oscillator output, at the input to the ATTENUATOR, is detected and amplified and is used to control the plate voltage of the sweep oscillator. The OUTPUT LEVEL control adjusts the bias on the first stage of the amplifier. This causes the DC levels in the entire amplifier to change and varies the average B plus supplied to the sweep oscillator from a minimum of 25 v. to over 100 v. A small decrease in the sampling voltage causes a large increase in the B plus supplied to the sweep oscillator and thus counteracts any amplitude variation as the oscillator is tuned over the range.

The operation of this circuit and of the sweep oscillator can be checked at the feedthru capacitor on the end of the Attenuator box or Pin 1 of V3. The waveform at this point will normally show a flat output level over the entire band. Adjusting the OUTPUT LEVEL will change this level.

MARKER SYSTEM DESCRIPTION

A sample of the sweep oscillator is mixed with a fundemental or harmonic of the crystal oscillator to produce a beat frequency "pip" or "birdy". The amplitude of the birdy is amplified and superimposed upon the demodulated swept signal and applied to the vertical amplifier of the oscilloscope. The size of the marker may be varied over a wide range by the gain control of the "birdy" amplifier.

EXTERNAL MARKER INPUT

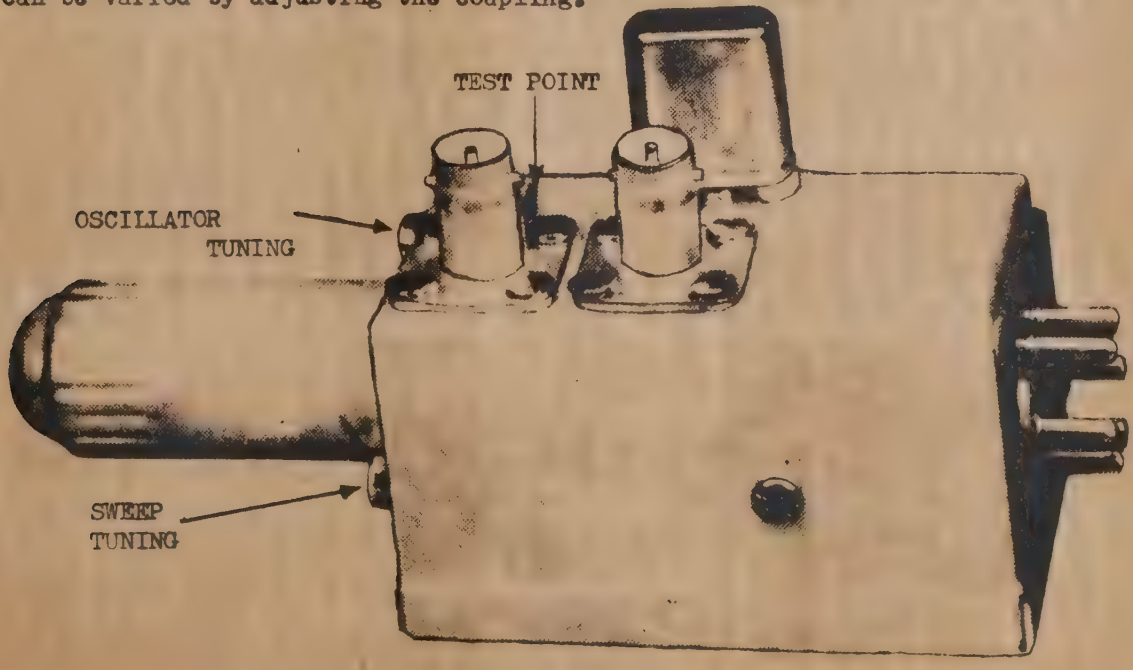
A separate mixer is provided for the external marker input. A low level sweep signal is introduced into the mixer so that a "birdy" is produced as the sweep crosses the input CW marker signal. The birdy is applied to the marker amplifier along with the other markers.

CRYSTAL OSCILLATORS (OPTIONAL)

These crystal markers are self contained plug in units. Additional units at other frequencies (with in the range of the sweep generator) may be ordered and substituted for the original units.

The crystal oscillator units include the tube, crystal, oscillator, tuning, mixer crystal diode and a tuned circuit selecting the sweep input frequency. A test point is provided for easy adjustment of the crystal oscillator. In making this adjustment, the crystal oscillator coil slug is adjusted for near maximum voltage at the test point. This is usually in the order of 2-5 volts as measured with a VTVM. The adjustment should be made just slightly off the peak on the low inductance side. The effects of tuning are critical on the other side of the resonance curve.

By tuning the sweep sample coil, the frequency of the sweep input signal can be varied and thus minimize unwanted markers generated from other harmonics from the crystal oscillator. The amplitude can be varied by adjusting the coupling.

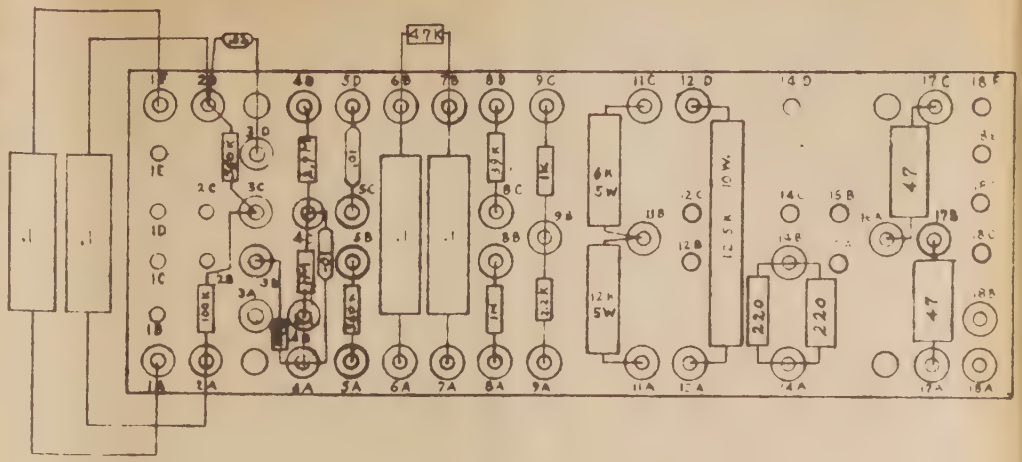


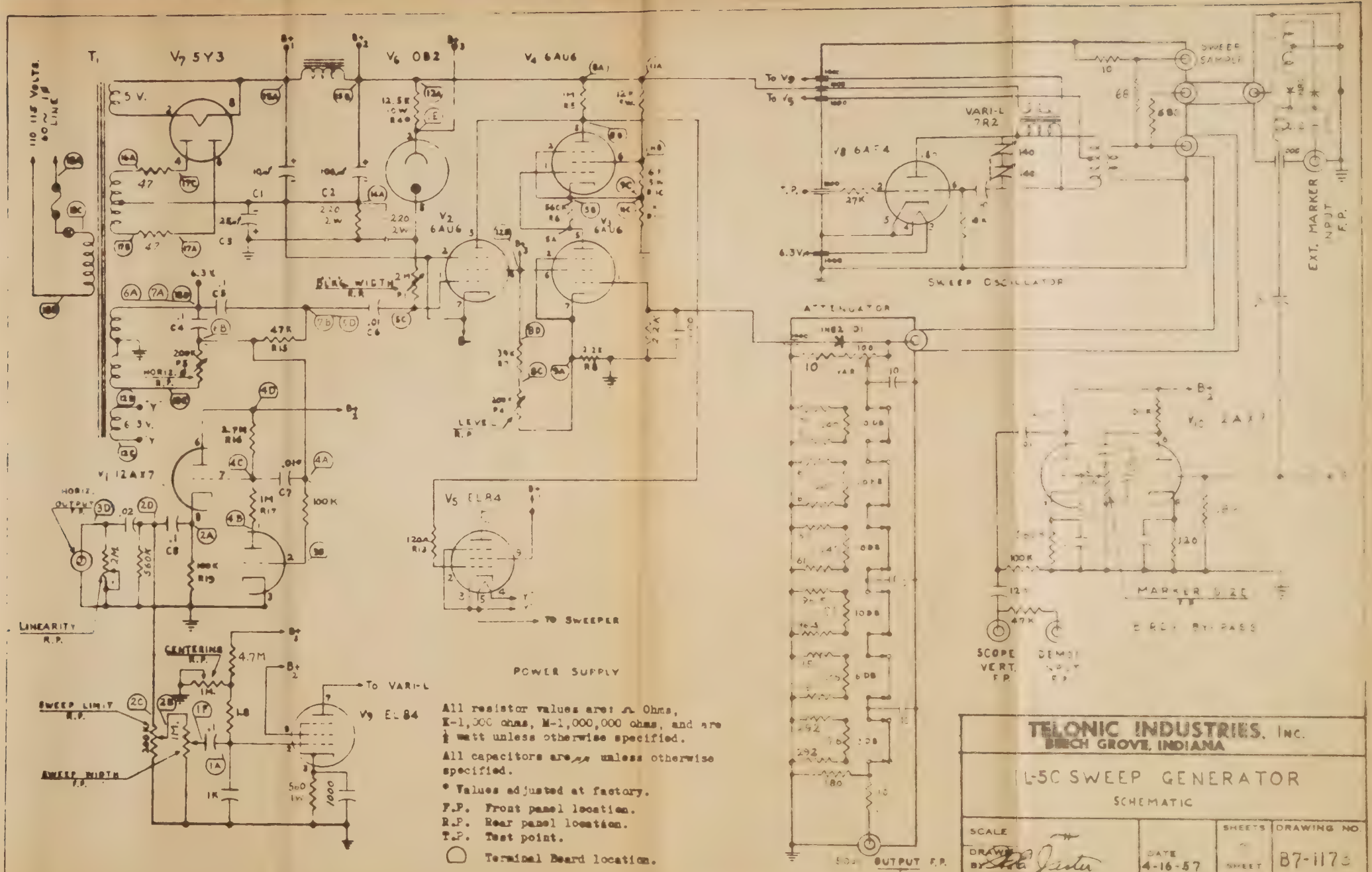
MAINTENANCE

By use of the schematic, operational diagram and the terminal board layout, voltage & waveforms, ordinary difficulties can be readily located and remedied. The following trouble-shooting chart is an additional aid to servicing:

SYMPTONS	POSSIBLE CAUSES & REMEDIES
Pilot light off and unit fails to operate	Fuse open -- replace —//— If 2nd fuse opens--look for cause of overload, shorted wiring, components, etc. (The 2- 47 ohm 1 watt resistors on terminal board burn out if the B+ circuit is overloaded and this protects the rectifier and transformer).
No Horizontal Output	Look for difficulty in the sawtooth circuitry V1 using terminal board layout and schematic to check waveforms and voltages.
R. F. Output is low or zero	Check B+ to sweep oscillator - P. 3 (V5) It should be a square wave of 25-100 v. of positive polarity and should vary as the output level control varies. —//— If it is normal, look for RF difficulties--bad tube, shorted or open wiring, defective components, etc. —//— If the voltage is low and does not respond to the leveler control, remove first V4 and then V2. When either of these tubes conducts, the voltage on grid of V5 (Pin 2) is reduced and thus decreases the B+ to the sweep oscillator. If removal of V2 allows the B+ on V5 (Pin 3) to return to normal, check the blanking width control, the tube and associated circuitry. If removal of V4 cases the B+ to return to normal, check the leveler controls, V3 and V4 & circuitry.

SYMPTOMS	POSSIBLE CAUSES & REMEDIES
Poor Leveling	Replace D1 (1N82) in attenuator box observing polarity. Leveler circuit requires negative control voltage so the plate of the diode should be connected to the feedthru capacitor. Also, try replacing V4, V3. V3 is most critical since it is in the first stage of the D.C. coupled amplifier. Resetting of the rear panel output level controls is necessary if V3 is changed. A flicker or break in the output level can sometimes occur if for some reason the OB2 regulator circuit isn't receiving enough voltage. Low line voltage or a change of tube characteristics could account for this. Shunting the dropping resistors R10 or R23 and R24 usually eliminates the difficulty. Occasionally a parasitic oscillation can occur in the leveling or in the sweep drive circuit and can cause a similar effect. The sweep output transformer consists of a choke used as a primary and 4 turns of #22 wire in the secondary. The position of these turns is critical and is carefully positioned to obtain flattest output on all channels. These turns are lightly cemented in place.
Weak Markers	Replace Crystal Diode Re-tune sweep input adjustment. Re-tune oscillator for max. voltage at test point.


47K
.25
.1
.1
.01
.1
.1
.01
.1
.1
.01



All resistor values are: Ohms, K-1,000 ohms, M-1,000,000 ohms, and are ½ watt unless otherwise specified.

All capacitors are μf unless otherwise specified.

* Values adjusted at factory.

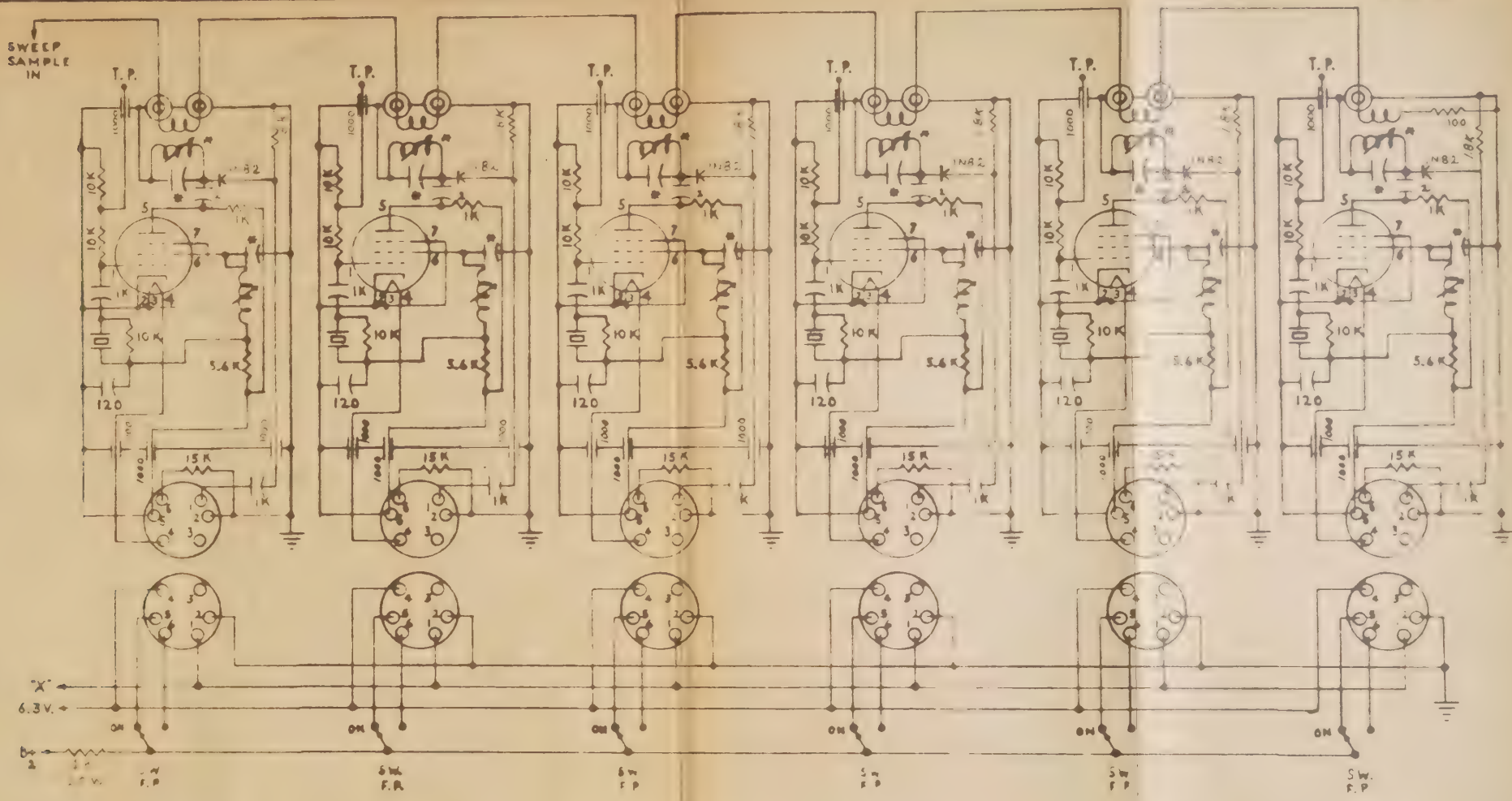
F.P. Front panel location.
R.P. Rear panel location.
T.P. Test point.

Terminal Board location.

TELONIC INDUSTRIES, INC.
BEECH GROVE, INDIANA

1L-5C SWEEP GENERATOR
SCHEMATIC

SCALE		SHEETS	DRAWING NO.
DRAWN BY Stella Foster	DATE 4-16-57	SHEET 1	B7-1173
APP'VD BY	DATE		



V No.	XTAL FREQ.	MARKER FREQ.
11	28·4	28·4
12	30·0	30·0
13	31·6	31·6
14	45·0	45·0
15	30·0	60·0
16	35·0	70·0

REVISIONS NO	DATE

TELONIC INDUSTRIES, INC.
73 N. 2nd Avenue BEECH GROVE, INDIANA

L-5C SWEEP GENERATOR
SCHEMATIC

SCALE		SHEETS	DRAWING NO.
DRAWN BY	DATE 4-16-57	2	B7-1173
APP'VD BY	DATE	SHEET 2	

SWEEP GENERATORS FOR TESTING AND ALIGNMENT OF

- BROADBAND F.M. DISCRIMINATORS
- R.F. TUNING DEVICES
- I.F. AMPLIFIERS
- MATCHING DEVICES
- RADAR, TELEMETERING
- RADIO, TELEVISION
- ANTENNAS
- R.F. SWITCHING DEVICES
- KLYSTRON TUBES
- NEW TUBE DESIGNS
- DELAY LINES
- TRANSMISSION LINES
- DEMODULATORS
- R. F. MIXERS
- R.F. FILTERS
- DISTRIBUTION SYSTEMS
- TRANSISTORS

FOR MEASUREMENT AND INDICATION OF

Gain	Coupling
Bandwidth	Leakage
Frequency Range	Attenuation
Frequency Response	Mechanical Faults
Spurious Response	Noise
VSWR	Efficiency

Telonic INDUSTRIES, INC.

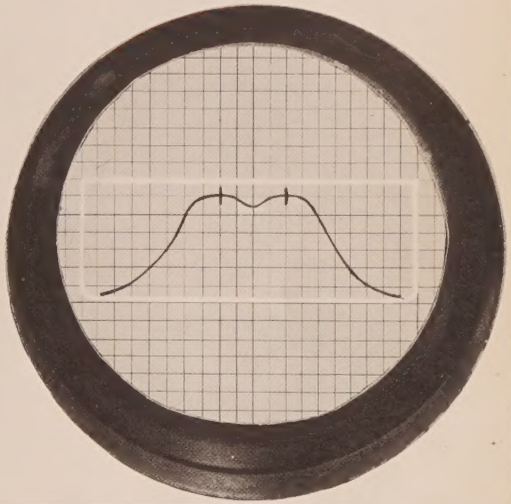
Telonic designs and manufactures

SWEEP GENERATORS

Featuring

High Signal Level
Low Leakage
Flat Output
Low Source VSWR
Accurate Marker Systems

MANY MODELS—Many frequency ranges



To facilitate your requests for quotations and orders, a handy form may be obtained from your field engineer or from TELONIC.

Telonic INDUSTRIES, INC.
BEECH GROVE, INDIANA
TWX—IP-254 Phone—STate 6-9239

THESE BASIC MODELS use sweep oscillators operating at fundamental frequency and are available in many ranges up to the limit of the standard receiver-type tube (6AF4A) and tuned-line circuitry. The listed models illustrate the ranges and sweep widths that may be obtained. *High outputs*, exceptional *uniformity* (flatness) and *purity* (freedom from harmonic and spurious content) are prime features of these models.

The model 200 series are fixed-tuned and sweep the entire range. This series is particularly useful for checking tuning devices, antennas, transmission line, broad-band amplifiers, and in making VSWR measurements, etc. The wide sweep technique is a new and powerful tool for *designing* as well as for *production*.

Deluxe Model S5-DT
Bench Style

THE SWEEP OSCILLATOR circuitry is contained in a tightly-shielded compartment that almost completely eliminates radiation. The precision vibrating capacitor consists of a silver-plated beryllium copper diaphragm. This all-metal unit has no tendency to warp or fatigue. The exceptionally long-life of this wobbulator is one of the reasons for the low maintenance cost of Telonic sweep generators.

OUTPUT LEVELING circuitry, using the same technique as in almost all regulated D.C. power supplies, is largely responsible for the high degree of flatness obtained in all Telonic sweep generators.

ORDERING INFORMATION

Designate model by adding appropriate symbols.

- S5 —Basic unit—portable style.
- S5-T —with TA-50 attenuator—portable style.
- S5-FT —with 4 plug-in fixed markers and attenuator—portable style.
- S5-CT —with 4 plug-in crystal-controlled markers and attenuator—portable style.
- S5-MT—with variable marker and attenuator—portable style.
- S5-DT —Complete marker system, attenuator — bench style.

ALL FUNDAMENTAL FREQUENCY

Model S5-MT
Portable Style

MASTER LINE—Tunable and Fixed SWEEP GENERATORS

Model	SWEEP Range	Sweep Width
S1-T	100-200 mc.	30%
S2-T	175-350 mc.	15%
S5-T	225-500 mc.	10%
S3A-T	440-920 mc.	6%
S4-T	950-1250 mc.	4%
S200-T	260-440 mc.	180 mc.
S201-T	325-500 mc.	175 mc.
S202-T	500-750 mc.	250 mc.
S203-T	650-950 mc.	300 mc.
S204-T	800-1200 mc.	400 mc.
S205-T	900-1250 mc.	350 mc.
S206-T	1200-1400 mc.	200 mc.
S207-T	50-90 mc. 160-220 mc.	40 mc. 60 mc.

Output—Over 1 volt p. to p.
Impedance—50 ohms
Flatness—5% at max. sweep width
Vernier Attenuation—0-approx. 20 db.

(See general specs. and features on back page)

ATTENUATOR AND MARKER SYSTEMS

Type	Description
"T"	TA-50 Attenuator
"F"	4 plug-in fixed markers. Each adj. over wide range. Stability better than .1%.
"C"	4 plug-in crystal-controlled markers with .005% accur. Available for sweep ranges to approx. 600 mc.
"M"	Variable, individually calibrated marker with .25% accur. covering full sweep range.
"D"	6 plug-in fixed or crystal-controlled markers; variable marker; 10 mc. harmonic marker.

(The "F" "C" - "M" & "D" systems include Birdy-By-Pass circuitry)

ULTRA RANGE SWEEPS H-1, H-2, H-3

ULTRA WIDE SWEEP WIDTHS are obtained by heterodyning two UHF oscillators whose construction is similar to that of the MASTER LINE units (6AF4A tubes operating at below 1000 mc.) The high signal level of the oscillators and the use of balanced mixer circuitry result in a stable, high level output.

THE TELONIC H-1 is similar to the MASTER LINE Model S3A-T, but, in addition to the fundamental range of 380-900 mc., it has a heterodyne range of 1-380 mc. The output of a fixed oscillator at 500 mc. is mixed with the UHF signal to provide the low range.

Ranges—1-380 mc. and 380-900 mc.

Sweep Width—250 kc-40 mc.

Flatness—HI range—5% at maximum sweep width
LO range—5% at sweep width of 10 mc.

Output—HI range—1 v. p. to p.
LO range—.2 v. p. to p.

Impedance—50 ohms

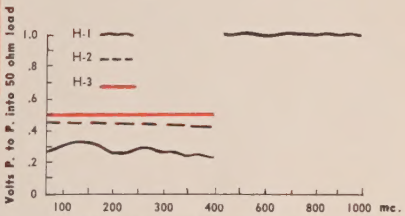
Attenuator—TA-50 (See Atten. specs.)

Vernier Atten.—0 to over 10 db.

Style—Portable

(See general specs. and features on back page)

Model H-1



Typical output versus range of H models

THE TELONIC H-2 and H-3 achieve very wide sweep widths by heterodyning *TWO SWEEP OSCILLATORS*. Since they are sweeping 180° out of phase with each other, the sweep widths are additive. The output leveling circuit maintains a flat output over the entire range. Tuning one oscillator tunes the center frequency of the heterodyne output, and varying the drive voltage of both wobbulators varies the sweep width.

These unique instruments are very useful in the designing and testing of broad-band video, IF, and RF amplifiers, filters, impedance matching devices, etc.

Model H-2

SPECIFICATIONS

	H-2	H-3
Center Frequency	1-200 mc.	1-200 mc.
Sweep Width	200 kc-200 mc.	200 kc-200 mc.
Output	.4 v. p. to p.	Over .5 v. p. to p.
Impedance	50 ohms (or 75)	50 ohms (or 75)
Flatness	15% to 150 mc. 20% to 300 mc.	15% to 300 mc.
Attenuation—Toggle Switch 20,20, 10,6,3, db & vern. 0-10 db.	TA-50 (or TA-75) & vern. 0-10 db.	
Marker—External marker input only	6 Markers—Type "C" or "F" and Birdy-By-Pass System	
Style	Portable	Bench

(See general specs. and features on back page)

Model H-3

EXTENDED RANGE SWEEPS

A series of instruments covering the range of 950-2300 mc. is accomplished by a new sweep generator design. Broad frequency coverage and wide sweep widths are obtained without resorting to the more complicated techniques normally used at these frequencies. A TELONIC MASTER LINE UHF sweep oscillator, a harmonic generating crystal and high-pass filter provide a high level, spurious-free signal at twice the frequency of the oscillator. Voltage leveler circuitry maintains constant output.

This new line of sweep generators is available with fixed or tunable center frequencies and with or without marker systems. The standard MASTER LINE Marker systems are available.

Output—.5 v. p. to p. into 50 ohms

Impedance—50 ohms—Type "N" Conn.

Flatness—10% on tunable models
15% on fixed models
measured at max. sweep width

Attenuation—Vernier atten. 0-20 db.

(See general specs. and features on back page)

Model E2

Models	Range	Sweep Width
E1	920-1400 mc.	0-50 mc.
E2	1200-2000 mc.	0-50 mc.
E3	1700-2300 mc.	0-50 mc.
E201	1000-1400 mc.	400 mc.
E202	1400-1800 mc.	400 mc.
E203	1700-2300 mc.	600 mc.

ELECTRONIC SWEEPS

These ultra flat sweep generators are swept electronically using a saturating reactance. Continuous tuning is accomplished by means of a precision variable capacitor.

Toggle switches and constant impedance resistive pads provide a very convenient and accurate means of attenuation.

The performance of these models approaches perfection—output is well over 1 volt, flatness better than 5%. There is very low spurious and harmonic content and the leakage is so low that even high gain Radar IF strips are unaffected.

Model	Center Freq.	Sweep Width
L1	450-1800 kc.	0-100%
L2	1.5-5.0 mc.	0-100%
L3	5-15.0 mc.	0-50%
L4	10-25 mc.	0-50%
L5	25-70 mc.	0-40%
L6	50-125 mc.	0-30%

Output—well over 1 volt p. to p.

Impedance—50 ohms

Attenuation—Toggle switch 20,20,20,10,6,3 db. & vernier atten. 0-10 db.

Flatness—Within 5% over max. sweep width

(See general specs. and features on back page)

Add "C" to Model No. for Xtal Marker system employing 6 plug-in crystal-controlled markers and Birdy-By-Pass circuitry—i. e. L1-C

Add "M" for Variable Marker and Birdy-By-Pass circuitry—i. e. L1-M

Add "D" for Deluxe instrument with 6 plug-in markers, variable marker, harmonic marker, and Birdy-By-Pass circuitry—i. e. L1-D

Telonic TELEVISION TRIO

FOR TV PRODUCTION, ENGINEERING, SERVICING

TELONIC sweeps are being used by a majority of the TV manufacturers. The features that are making them so popular are their excellent specifications (flatness, high output, wide sweep, etc.) efficient design (compact size and shape, simplicity of operation, accessibility for easy servicing); outstanding performance (dependability, low maintenance); and the *ability of TELONIC to modify standard specifications to meet individual needs.*

Obsolete installations are being replaced with TELONIC units to increase production efficiency, reduce maintenance costs and to improve the quality of the product.

UHF

Model S3A-FT

The S3A-FT is an ideal UHF TV test instrument that has high level, flat output, wide sweep, four plug-in fixed adjustable markers with Birdy-By-Pass system and a precision Step-Attenuator. A four position detent system as shown above is also available. (Specify DT-4 detent system if desired.)

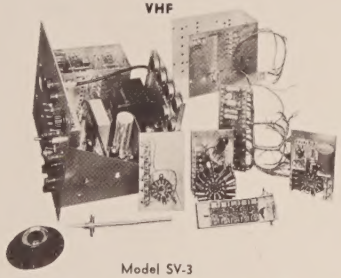
- Range—440-920 mc.
- Width—0-50 mc. at 500 mc.
- Output—Well over 1 v. p. to p. into 50 ohms
- Flatness— 5% over max. sweep
  15% over entire range
- Attenuation—TA-50 & vernier atten. 0-10 db.
- Markers—4 Plug-in Fixed markers with Birdy By-Pass system
- Style—Portable

(See general specs. and features on back page)

IF

Model L5A-P

VHF



Model SV-3

This 13-position sweep generator uses a separate crystal on each channel to produce 2 pulse markers, one on the video and one on the audio frequencies. A special circuit forms pulses with much greater accuracy and stability than the usual multivibrator method.

Special features of this compact VHF-TV sweep and marker generator are: electronic sweep; 25 mc. sweep width; hi-level, flat output; special crystal-controlled pulse markers; and removable sweep and marker sub-chassis.

- Style—Portable
- Range—12 channels & 43 mc. I.F.
- Sweep Width—25 mc. adjustable
- Output—Well over 1 v. p. to p. into 75 ohms
- Impedance—75 (300 ohms balun supplied) ohms
- Flatness—5% over each channel—10% over all
- Attenuation—20,20,20,10,6,3 & 10 db. vern. atten.
- Markers—Pulse-type markers on video and audio
- Style—Portable

(See general specs. and features on back page)

This TV IF sweep, Model L5A-P, and crystal-controlled marker generator is a variation of an L Model. 6 crystals are used in passive networks to accurately key pulse markers.

- Center Frequency—35-55 mc.
- Sweep Width—4-15 mc.
- Output—1 v. into 75 ohms
- Attenuation—20,20,20,10,6,3 and 10 db. vernier atten.
- Markers—6 Crystal—controlled pulse-type markers
- Style—Portable

(See general specs. and features on back page)

Telonic RF ACCESSORIES

RF ATTENUATORS 0-1000 mc.

TURRET

TA-50, TA-75

Attenuation—0,10,20,30,40, 50 db.
Size—2⅛" x 1¾"

TB-50, TB-75

Attenuation—0,1,2,3,4,5,6, 7,8,9,10,20 db.
Size—3" x 1¾"

- Impedance—50 or 75 ohms
- VSWR—1.2:1 to 500 mc.
  1.3:1 to 1000 mc.
- Shaft—2" x ¼" round
- Accuracy—.25 db. on all steps to 10 db.
  .5 db. on higher steps
- Connectors—BNC
- Power—½ watt average, 1 kw peak
  (Mounts like a potentiometer)

DECADE

TAD-50
TAD-75

Two 6-position and 12-position attenuators arranged in decade allow any combination up to 110 db. in 1 db. steps.

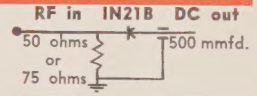
- Attenuation—0-110 db.
- Impedance—TAD-50—50 ohms
  TAD-75—75 ohms
- VSWR—1.2:1 to 500 mc.
  1.3:1 to 1000 mc.
- Accuracy— .25 db. to 10 db.
  1.25 db. to 110 db.
- Size—9½" x 3" x 4¾"

TOGGLE SWITCH ATTENUATORS—Several models available—up to 100 db. in 1 db. steps—Range—DC—200 mc.
Also, Toggle Switch Attenuators built to order. Write for complete information.

RF DETECTORS

- Frequency Range—1-1000 mc. (useful to 2500 mc.)
- VSWR—1.05:1 to 500 mc.
  1.1:1 to 750 mc.
  1.2:1 to 1000 mc.

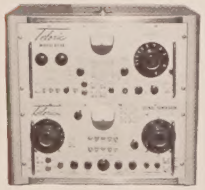
Small, black anodized aluminum block. Easily-replaced crystal.



Models	Imped.	Connectors
XD-3	50 ohms	BNC
XD-4	75 ohms	BNC
XD-5	50 ohms	N

NEW Telonic INSTRUMENTS

RADAR TEST SET



MOD. SSX-1/PAM-1

Complete signal source for testing Radar IF strips
Includes: AUDIO — 50 WATT VIDEO PULSE — C.W. PULSE — C.W. — MODULATED C.W. — R.F. SWEEP — VARIABLE MARKER — CRYSTAL HARMONIC MARKER.
(Detailed spec. sheet available from Telonic or Telonic representatives)

DOUBLE RANGE SWEEPS

A new "double" range sweep generator is now available. This multi-purpose unit includes two sweeping oscillators—one wide-band fixed tuned oscillator and the other a normal tunable sweep oscillator covering the same frequency. Frequency ranges, styles, and markers of either the Master Line or the Extended Range may be provided.

Model is designated by combining the number of the standard tunable and fixed sweeps. (I.E.: E3-203-D)

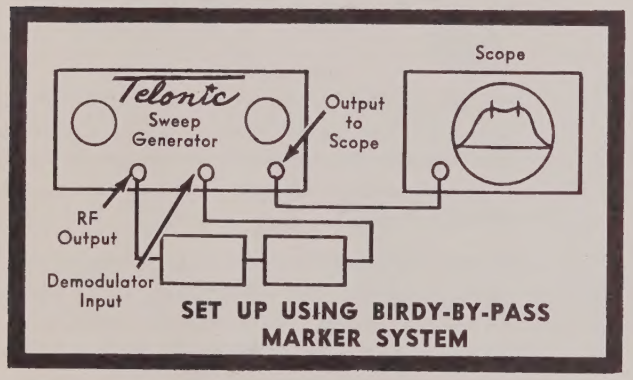
DESCRIPTION OF MARKER SYSTEMS

BIRDY-BY-PASS

The Birdy-By-Pass marker system is standard on the MASTER LINE, H-3, EXTENDED RANGE, and the ELECTRONIC SWEEP models.

In this system, beat or birdy pips are produced by mixing a sample of the sweep oscillator signal with the marker output; the "birdies" are fed through an amplifier and are added to the demodulated sweep signal before it is connected to the scope vertical amplifier. The markers completely bypass the device under test.

Since the markers are produced directly, no frequency error can occur other than in the marker oscillator itself. Thus, the error that is present in the pulse system, due to keying of the multivibrator, is avoided. In addition to its major features—accuracy, stability and versatility, it has the advantage of simplicity, allowing this system to be used on the Portable style models.



SET UP USING BIRDY-BY-PASS MARKER SYSTEM

CABINET STYLES

PORTABLE STYLE

The Portable Style is particularly appropriate in applications where space is at a premium. The cabinet measures only 10″ x 12″ x 9½″ and weighs approx. 25# (Shpg. wt 40# approx.) Louvers on the sides and perforated panels on the top provide ventilation. Leather handle and the compact size allow for easy-carrying. This style is used on standard Telonic sweep generators, except the H-3 and Deluxe models.

BENCH STYLE

The Bench style is used on Deluxe models and H-3 and provides ample panel and chassis space for combination marker systems and extra features. The studio-type cabinet measures 23″ x 16″ x 13″. These models weigh approx. 50# (Shpg. wt. 100# approx.) Chrome-plated handles are provided on each side. The back is partially open and the top and bottom are removable for easy servicing and adjustment of unit.

PLUG-IN MARKERS*

Plug-in markers of two types are available, either crystal-controlled oscillators with an accuracy of .005% or fixed oscillators adjustable over a wide range with a stability of .1%. Extra units may be obtained from TELONIC to provide for changing requirements.

*(*Designated by "C" for Crystal type; "F" for Fixed type)*

CALIBRATED VARIABLE MARKER*

A calibrated variable marker is available for nearly all ranges. They are individually calibrated and engraved to an accuracy of .25% at intervals spaced for best readability.

*(*Designated by "M" in Model No.)*

CRYSTAL-CONTROLLED HARMONIC MARKERS*

Crystal-controlled harmonic markers are available in Deluxe Models utilizing the Birdy-By-Pass marker system. Crystal oscillator and frequency multiplier circuitry produces markers at multiples of the crystal frequency. The following frequencies are available:

Above 1200 mc. — 20 mc.
Above 500 mc. — 10 mc.
Below 500 mc. — 5 mc.
Below 100 mc. — 2.5 mc.
Low Ranges — 1 mc.

FEATURES AND SPECIFICATIONS COMMON TO ALL MODELS

Zero Base Line—Return sweep is blanked
Horiz. Sweep Voltage—Sawtooth of approx. 40 volts peak to peak
Radiation—Less than 10 microvolts
Source VSWR—Normally below 1.2:1
Display Linearity—Better than 1.2:1
Power—115 v. 60 cps (50 cps available)

DT-4 Tuning Detent

A 4 position mechanism may be added to the sweep generator's tuning dial as a production aid. Each position is easily adjusted from the front of the instrument.